PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	NAD TITUTED ACTION C	Porm PCT/IPEA/416					
P06231PC00	FOR FURTHER ACTION See I						
International application No.	International filing date (day/month/yea						
PCT/SE 2003/001996	18.12.2003	18.12.2002					
International Patent Classification (IPC) or national classification and IPC							
B01J 19/12	B01J 19/12						
Applicant							
PERSONAL CHEMISTRY I	UPPSALA AB et al						
		A Latin Transpired Proliminary Avamining					
This report is the international pr Authority under Article 35 and to	ransmitted to the applicant according to a						
2. This REPORT consists of a total	of 5 sheets, including the	s cover sheet.					
3. This report is also accompanied	by ANNEXES, comprising:						
a. (sent to the applican	a. (sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:						
about of the	description claims and/or drawings whi	ch have been amended and are the basis of this report					
and/or sheet	s containing rectifications authorized by ive Instructions).	this Authority (see Fule 70.16 and Section 607 of the					
Laider assuration	annewed earlier charte but which this	Authority considers contain an amendment that goes					
beyond the Supplement	disclosure in the international application	as filed, as indicated in item 4 of Box No. I and the					
	ional Bureau only) a total of (indicate ty)	on and number of electronic carried (S))					
	containing a semigrace	listing and/or tables related thereto, in computer					
readable form only,	as indicated in the Supplemental Box Re	elating to Sequence Listing (see Section 802 of the					
Administrative Inst							
4. This report contains indications							
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Box No. II Priori		arely investigates and industrial applicability					
. .		ovelty, inventive step and industrial applicability					
	of unity of invention	la construcción son or industrial					
Box No. V Reason applies	oned statement under Article 35(2) with i cability, citations and explanations suppo	regard to novelty, inventive step or industrial orting such statement					
Box No. VI Certa	in documents cited						
Box No. VII Certa	in defects in the international application						
Box No. VIII Certa	in observations on the international appl	ication ·					
	Days of any	npletion of this report					
Date of submission of the demand		White was a great a character of the control of the					
07.07.2004	02.03	.2005					
Name and mailing address of the IPEA							
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Facsimile No. +46 8 667 72 86	l — • - •	No. +45 3 782 25 00					

Form PCT/IPEA/409 (cover sheet) (January 2004)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE 2003/001996

Box	No. I	Basis	of the report				
1.	otherw	ise indicat	he language, this report is based on the international application in the language in which it was filed, unless ed under this item.				
		This repor	rt is based on a translation from the original language into the following language, he language of a translation furnished for the purposes of:				
			nternational search (under Rules 12.3 and 23.1(b))				
		Π̈,	sublication of the international application (under Rule 12.4)				
		i	nternational preliminary examination (under Rules 55.2 and/or 55.3)				
2.	With regard to the elements of the international application, this report is based on (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):						
			national application as originally filed/furnished				
	\boxtimes	the descr					
		pages	1-7 as originally filed/furnished				
		pages*	received by this Authority on				
	K21	pages* .					
	\boxtimes	the clain					
		pages .	as originally filed/furnished as amended (together with any statement) under Article 19				
1		pages* .	8-9 received by this Authority on 04.01.05				
		pages*	received by this Authority on				
	\square	the draw					
		•	1-2 as originally filed/furnished				
1		pages*	received by this Authority on 04.01.05				
1		pages*	received by this Authority on				
			nce listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.				
3.	Ш	The am	endments have resulted in the cancellation of:				
1			the description, pages				
			the claims, Nos.				
		$\cdot \sqcap$	the drawings, sheets/figs				
		Ħ	the sequence listing (specify):				
1		Ħ	any table(s) related to the sequence listing (specify):				
4.		This remade, s 70.2(c)	port has been established as if (some of) the amendments annexed to this report and listed below had not been ince they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule).				
			the description, pages				
		\sqcap	the claims, Nos.				
		Ī	the drawings, sheets/figs				
		\sqcap	the sequence listing (specify):				
			any table(s) related to the sequence listing (specify):				
*	If ite	m 4 applie	s, some or all of those sheets may be marked "superseded."				

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE 2003/001996

Box No. V	Reasoned statement un citations and explanati	nder Article 3 ons supporti	5(2) with regard to novelty, inventive step or industrial applicability; ng such statement	
1. Statemen	clty (N)	Claims Claims	1-14	ÆS io
Inve	ntive step (IS)	Claims Claims	1-14	(ES ⁻
<u>Indu</u>	strial applicability (IA)	Claims Claims	1-14	æs 10

2. Citations and explanations (Rule 70.7).

Documents cited in the International Search Report:

- D1) WO-02/052279-A
- D2) DE-196 12 265-A
- D3) JP-61 033 657-A
- D4) DE-197 44 940-A
- D5) WO-02/089974-A
- D6) US-5 264 185-A

The present invention relates to a micro vial assembly for performing microwave-assisted chemical reactions on small volumes, especially organic synthesis reactions. It also relates to a system for performing microwave-assisted chemical reactions on small reaction-mixture volumes and the use of such a system.

The aim of the invention is to solve problems in connection with small reaction-mixture volumes. These problems are, for example, to design the geometry in the top portion of a reaction vessel, in order to facilitate reflux/reflow of liquid. The assembly should be adapted for co-operation with external equipment designed for micro-wave-assisted chemistry on a larger scale. The assembly should be designed to ensure comparative temperature and pressure detection results.

Amongst the documents cited in the search report, DI comes closest to the invention according to the amended claims of January 4, 2005.

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PCT/SE 2003/001996

Supplemental Box

-In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V

D1 (abstract, p.1, p.3-4, p.6-p.7 and fig. 3-5) discloses a seal mechanism, an apparatus and a method for confining a chemical reaction in a reaction vessel (1) (vial tube). Microwaves can assist the reaction. The vessel has a cap (6) and a self-sealing diaphragm (5) at the top of the vessel.

The micro vial assembly in claim 1, the system for performing microwave-assisted chemical reactions in claim 11 and the use of such a system in claim 13 differ from what is disclosed in D1 in the subject matter stated on lines 6-11 in claim 1. Hence, the invention is novel.

The problems to be solved by the present invention (cf. the second paragraph on this form) are not revealed in D1. This document does not give any information that would lead a person skilled in the art to the claimed method, system and use. Therefore, the claimed invention is not obvious to a person skilled in the art.

Consequently, the invention according to claims 1-14 is considered to involve an inventive step. It is further considered to be industrially applicable.

Concerning observations in the claims, see Box VIII.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE 2003/001996

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The claims are not divided into a prior art part and a characterising part, cf. PCT, Rule 6.3 (b).

Form PCT/IPEA/409 (Box No. VIII) (January 2004)

10/539045

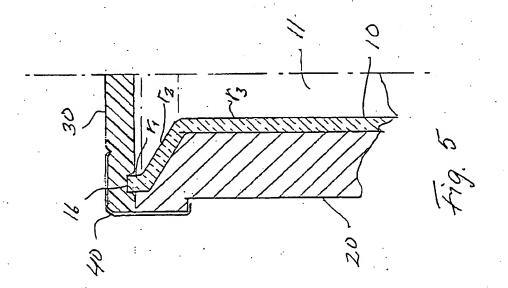
JC17 Rec'd PCT/PTO 15 JUN 2005

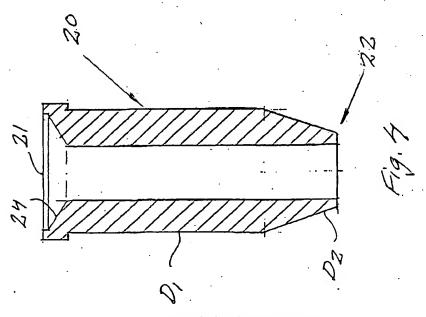
CLAIMS (2005-01-03)

- 1. A micro vial assembly for performing microwave-assisted chemical reactions on small volumes, the assembly comprising:
- a micro-wave transparent reaction vessel (10) having an open upper end and a closed bottom end;
- a cap (40) having a through hole, and a sealing diaphragm (30), wherein a sleeve (20) is formed with a through hole, the vessel extending axially through the sleeve and the cap securing the vessel to the sleeve while clamping the diaphragm for sealing the open upper end of the vessel, the open upper end of the vessel being formed with a widening portion (14,15,16), the widening portion being received in a corresponding recess formed in an end plane of the sleeve, the recess providing a seat (24) for the widening portion in the open upper end of the vessel.
- 2. The micro vial assembly of claim 1, wherein the upper end of the sleeve is formed circumferentially for engagement with the cap, the sleeve having a first diameter portion (D₁) running from the upper end to meet a reduced diameter portion (D₂) in the lower end of the sleeve.
- 3. The micro vial assembly of claim 2, wherein the portion of reduced diameter in the lower end of the sleeve is a truncated cone.
- 4. The micro vial assembly of claim 1, wherein the widening portion of the vessel (10) and the seat (24) in the end plane of the sleeve (20) are both conical in shape.
- 5. The micro vial assembly of any previous claim, wherein the open end of the vessel (10) is defined by a rim (16) protruding above the upper end of the sleeve (20) when the vessel is supported in the sleeve, the rim being dimensioned to be depressed in the lower side of the diaphragm (30).
- 6. The micro vial assembly of claim 5, wherein the rim (16) has an inner perimeter extending transversely to the diaphragm (30), sealing the open end of the vessel.
- 7. The micro vial assembly of claim 6, wherein the inner perimeter of the rim (16) defines a portion of the vessel cavity having a first radius r1, said first radius

portion meeting a second portion of reducing radius r2, the reducing radius portion smoothly transforming into a portion of continuous radius r3 defining a reaction chamber of the vessel cavity.

- 8. The micro vial assembly of any previous claim, wherein a bottom of the vessel (10) is formed through a radial compression (12) of the vessel, located above the terminal end (13) of the vessel.
- 9. The micro vial assembly of any previous claim, wherein the vessel (10) has an inner volume including a head-space volume which is less than 20 times that of the smallest reaction mixture volume contained in the vessel.
- 10. The micro vial assembly of any previous claim, wherein the vessel (10) is dimensioned for performing microwave-assisted chemical reactions on small volumes of 500 μ l or less.
- 11. A system for performing microwave-assisted chemical reactions on small reaction mixture volumes, comprising a micro vial assembly (10,20,30,40) according to any previous claim 1-10.
- 12. The system of claim 11, wherein the outer perimeter of the sleeve (20) is dimensioned for bridging the radial distance between a wall of the vessel (10) and an entrance diameter (D) of a microwave cavity (1) in the system.
- 13. The use of a micro vial assembly according to any of claims 1-10 for performing microwave-assisted chemical reactions, in particular microwave-assisted organic synthesis reactions.
- 14. The use of a system according to any of claims 11-12 for performing microwave-assisted chemical reactions, in particular microwave-assisted organic synthesis reactions.





AMENDED SHEET